CLAIMS

1. A method of supplying a spectrally filtered wideband signal to a load device comprising:

gating a switching device to produce a pulse,

releasing the pulse into an inductor of a resonant circuit by switching off a conduction path of the switching device after issuing the pulse, said resonant circuit providing a desired spectral response for said pulse, and

dissipating energy of the resonant circuit directly into the load device, whereby to produce said spectrally filtered wideband signal across said load device.

2. The method of claim 1, wherein said load device comprises an antenna.

3. The method of claim 1, wherein said switching off occurs at or near a zero crossing of oscillations of said resonant circuit across said transistor.

4. The method of claim 1, wherein said desired spectral response of said resonant circuit takes into account the

5. A method of supplying an antenna with a spectrally-filtered ultra wideband signal, said method comprising providing a resonant circuit having an inductor-capacitor network coupled directly to said antenna, applying a voltage potential across an inductor of the inductor-capacitor network of said resonant circuit, gating a field effect transistor to open a conduction path thereof to supply a pulse directly to said resonant circuit, and immediately pinching-off the conduction path of the field

effect transistor after release of said pulse whereby to dissipate pulse energy of said resonant circuit into said antenna.

6. The method of claim 5, wherein said pinching-off occurs when drain current through said transistor reaches or is near zero.

7. The method of claim 6, wherein said gating occurs at a given point during resonant cycles of said resonant circuit.

8. The method of claim 5, wherein, in said pinching off step, the field effect transistor is pinched-off to a non-conducting state.

9. An ultra wideband transmitter to transmit an ultra wideband signal, said transmitter comprising:

a switching device that produces a pulse in response to current flow through a conduction path thereof,

a timing circuit to gate the switching device,

a filter network, and

a timing circuit to gate the switching device to release a pulse directly into the filter network and to pinch-off the conduction path after release of said pulse.

10. The transmitter of claim 9 wherein said switching device comprises a field-effect transistor, and further includes a bias voltage applied to said transistor to effect production of said pulse.

11. The transmitter of claim 10, wherein said filter network controls the transmitted ultra wideband signal in at least one of center-frequency, bandwidth, and impedance value of a load.

12. The transmitter of claim 9, wherein said filter network includes a series inductor sectioned into two sections, and wherein said switching device includes a drain terminal coupled to said filter network between said sectioned inductors whereby to produce opposing potentials at said drain terminal after issuing said pulse.

13. The transmitter of claim 12, wherein said timing circuit is operative to turn off said transistor when current in the drain terminal approaches or nears zero.

14. The transmitter of claim 11, wherein said filter network takes into account the parasitic capacitance of said transistor during non-conduction to provide said at least one of center-frequency and bandwidth.

15. An ultra wideband transmitter to supply a spectrally filtered UWB signal to a load device comprising:

a switching device having a gate to produce a UWB pulse,

a singly-terminated resonant circuit that provides a desired spectral response for said UWB pulse, said resonant circuit including a series inductor and a shunt capacitor,

a timing circuit to drive the gate of the switching device to effect release of the pulse into the inductor of said resonant circuit by immediately switching off a

conduction path of the switching device after issuing the pulse, and

a load device coupled to an output of said resonant circuit to dissipate energy directly into the load device, whereby to produce said spectrally filtered UWB signal across said load device.

16. The transmitter of claim 15, wherein said load device comprises an antenna and said timing circuit switches off switching device at or near a zero crossings of current flowing through said transistor.

17. The transmitter of claim 16, wherein said series inductor is split into two sections, and said transistor is connected between said sections to produce opposing currents during release of pulse therebetween.

18. An ultra wideband transmitter that produces a band-limited ultra wideband signal of a desired energy level, said transmitter comprising a pulse conditioning circuit having a predetermined spectral response, a source of power to apply a bias potential across an inductor of a filter network, and a timing circuit that controls a switching device to effect release of a pulse into the pulse conditioning circuit in a way to dissipate a majority of pulse energy of the pulse conditioning circuit into a load device.

19. The ultra wideband transmitter of claim 18, wherein said switching device comprises a field-effect transistor, and said timing circuit effects opening of a conduction path of the transistor to produce said pulse by operating

said transistor in a non-linear mode to pinch-off the conduction path after release of said pulse.

20. The ultra wideband transmitter of claim 19, wherein said pulse conditioning circuit comprises a resonant circuit, and said timing circuit releases said pulse in accordance with a resonant cycle of said resonant circuit.

21. The ultra wideband transmitter of claim 19, wherein said timing circuit controls said gate to effect pinching-off the conduction path when drain current of said transistor reaches or is near zero.

22. The ultra wideband transmitter of claim 19, wherein said load device comprises an antenna.

23. A highly-efficient ultra wideband transmitter having an power conversion ratio greater than 50% comprising:

an antenna,

a resonant circuit having a singly terminated inductor-capacitor network coupled directly to said antenna,

a switching device that applies a voltage potential across an inductor of the inductor-capacitor network of said resonant circuit, and

a timing circuit to gate the switching device to open a conduction path thereof to supply a pulse directly to said resonant circuit, and to immediately pinch-off the conduction path of the switching device after release of said pulse to said resonant circuit, whereby to dissipate

greater than 50% of pulse energy of said resonant circuit into said antenna.

24. The transmitter of claim 23, wherein said timing circuit effects pinching-off said switching device when drain current through said transistor reaches or is near zero.

25. The transmitter of claim 23, wherein said timing circuit effects control to gate said pulse at a given point during resonant cycles of said resonant circuit.

26. A system for generating band-limited ultra wideband signals comprising a singly terminated filter having an input section and a current switching device directly coupled to said input section and operated in a highly nonlinear manner such that a substantial fraction of the current switched into the filter passes directly through said filter.

27. A system for producing band-limited ultra wideband signals comprising a singly terminated filter having an input section and a current switching device directly coupled to the input of said filter, wherein said input section possesses a secondary resonance, and wherein said current switching device is operated in a highly nonlinear manner such that a substantial fraction of the current switched into the filter passes directly through the input section of said filter, and wherein said current switching device has a conduction time chosen to be compatible with said secondary resonance.